EVALUATION OF THE EFFECTIVENESS OF ENVIRONMENTAL PLANNING, ASSESSMENT AND MANAGEMENT OF PROJECTS

WORKSHOP REPORT

January 10, 1986

Planning and Assessment Branch
Ministry of Environment

Dr. R. W. Langford
W. Bruce Morgan

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INTRODUCTION

On January 10, 1986 a workshop on the Evaluation of the Effectiveness of Environmental Planning, Assessment and Management of Projects was sponsored by the Planning and Assessment Branch of the B.C. Ministry of Environment. The objectives of the workshop were:

1. To develop an understanding of evaluation of the effectiveness of the environmental planning, assessment and management of projects and its application based on the Banff 1985 "Follow-up/Audit" Conference and other related experience; and

2. To review the current status of 'evaluation' in British Columbia and develop terms of reference and policy recommendations on how to more fully and effectively apply the concept in B.C.

The purpose of this report is to summarize the discussions and findings of the workshop. It is hoped that each reader will be able to use this material when considering the development of appropriate procedures for evaluation or when conducting evaluations.

The schedule for the workshop is presented in Appendix 1. This report follows the same sequence of presentations and discussions. The results of the concurrent discussion sessions of the workshop have been amalgamated into single sections. Divergent opinions, solutions or recommendations have been included to present as wide a spectrum of considerations as possible. The participants in the workshop and the discussion groups they were members of are listed in Appendix 2.

EVALUATION: DEFINITIONS

The working definition for evaluation (Appendix 3) was discussed by the two workshop groups. From this discussion, the definition has been extended to cover the following points. Firstly, the definition of evaluation should encompass the evaluation of "process", whether it is part of formal government process or informal working agreements between government and industry. "Process" should be considered to cover all parts of a project from conception, to completion or operation. Evaluation thus applies to the major processes employed such as the Energy Project Review and Mine Development Review, as well as to the array of referral processes.

Secondly, "evaluation" should also measure the attainment of specific goals or objectives. This was emphasized for both technical and process oriented evaluation. A revised definition encompassing these two important concepts is given below.

EVALUATION

"Evaluation" denotes the analysis and interpretation of effectiveness, efficiency and efficacy of any and all components of projects, process, programs, policies and legislation. Technical, ecological, social, economic, design and institutional criteria can be employed.

Project evaluation, emphasized in this workshop, applies to the following components of project planning, assessment and management:

1. Formal or informal management process.
2. Project planning.
3. Resource inventory.
4. Project Feasibility.
5. Assessment (impact prediction, mitigation, design).
6. Review.

7. Project implementation/construction.
8. Project administration.
9. Cleanup; revegetation; reclamation.
10. Project operation.
11. Abandonment.

FOLLOW-UP AUDIT OF ENVIRONMENTAL ASSESSMENT RESULTS
THE BANFF CENTRE SCHOOL OF MANAGEMENT
October 13-16, 1985

The Banff conference brought together a wide range of Canadian and international experience on the present application and future requirements of follow-up audit. Presentations and workshops were focussed on four themes: Impact Prediction; Mitigation and Monitoring; Public Involvement; and Management Procedures. The objective within each theme was to explore means of improving environmental impact assessment through the use of follow-up audit; in other words, how to learn from experience.

The results of the discussions as reported in the final session reflect the newness of the concept of follow-up audit. Although general support for learning from experience was expressed, many questions regarding definition, applicability, responsibility and utility remained unanswered or were the subject of numerous divergent responses. Consequently, although the Banff Conference provided a forum for discussion, the means for incorporating follow-up audit remained unclear. To proceed with implementation of follow-up audit as a component of the project management process, each institution must begin to address this issue.

SUMMARY OF FOUR WORKSHOP PAPERS

1) PREDICTION OF ENVIRONMENTAL IMPACTS AT A SILVER-GOLD MINE

B. Wilkes; Ministry of Environment;
Waste Management Branch; Smithers, B.C.

The paper presented by Mr. Wilkes described EIA and project review aspects of an impact assessment for Equity Silver Mines Ltd. Inadequacies in the assessment led to serious acid mine drainage occurring from the mine tailings dump. The prediction of microbiological acid production was incorrectly assessed and therefore adequate planning and mitigation was not incorporated into mine development. This failure was attributed to inaccurate interpretation of geochemical data and inadequate review and planning. Significant costs are now being incurred by the company for impact mitigation.

Advances in acid mine drainage technology and the creation of a mine review process in B.C. have reduced the likelihood of this type of problem recurring.

2) ENVIRONMENTAL MANAGEMENT OF MAJOR CONSTRUCTION PROJECTS IN B.C.

W.C. Phillips and R.W. Langford

Twelve major projects were reviewed to examine the content and effectiveness of the environmental management components of the project. Aspects considered included:

1. Planning, Assessment and Review

2. Project Documentation
   - Procedures Manual
   - Alignment Sheets
   - Environmental Index Summary
   - Contract Specifications

3. Project Management and Regulation
   - Policy and Objectives
   - Surveillance and Supervision
   - Authority of Committees or Personnel
   - Reporting and Liaison
   - Inter Governmental Agreement

The findings of the review indicate that a wide range of effectiveness was evident in the projects examined. The most successful projects had included the program components listed above from the planning stage through to construction.

Conclusions of the paper point to the need for a standardized approach to project management in B.C. incorporating the program components reviewed in the report. Successful project management is, to a large extent, founded on good intentions and personal relationships between government and industry. The use of a project steering committee has proven effective in enhancing these intentions and fostering effective communication.

3) REACHING AGREEMENT IN IMPACT MANAGEMENT
A CASE STUDY OF THE UTAH AND AMAX MINES

A.H. Dorcey B.R. Martin

The Amax and Utah mine projects were evaluated by Westwater Research Centre. Both projects were examined in relation to impact assessment and mitigation. Both technical and process evaluation was carried out by the authors. Results of the study were used to suggest ways of enhancing the cost effectiveness of impact assessment monitoring and management (IAMM). Principally, the authors suggest that this can be carried out by improving the ways people interact in resolving issues of personal and group interaction skills and through changes in technical skills and design of IAMM processes.

These interpersonal skills were discussed under headings:

1. Communicating Effectively.
2. Challenging Effectively.
3. Bargaining Successfully.

The technical skills were:

1. Putting Theory Into Practice.
2. Practicing Interdisciplinary Science.
3. Exercising Judgment.

The evaluation of these two projects examined both technical and process components to show how cost effectiveness of both could be improved. Both projects were in place prior to establishment of the metal mines guidelines process. Both this and the Wilkes paper are extremely valuable to put the current Mine Development Review Process in perspective.

4) IMPLEMENTATION OF ENVIRONMENTAL IMPACT ASSESSMENT RECOMMENDATIONS THE ROBERTS BANK PORT EXPANSION EXPERIENCE

R. Moody
AIM Ecological Consultants Ltd.

B. Morgan
Ministry of Environment

Experience with the implementation of the recommendations of the Roberts Bank Environmental Assessment Panel has provided a variety of lessons on the linkages between environmental assessment, implementation and monitoring, and the means for ensuring their timely consideration. Two areas are highlighted in the paper: committee responses to predicted and unexpected impacts; and organizational factors necessary for effective Committee operation.

The Roberts Bank Environmental Review Committee (RBERC) was formed to oversee implementation of nineteen Panel recommendations covering a very broad range of topics. As an implementation body, the Committee has dealt with a wide range of both predicted and unexpected impacts resulting from the port expansion. Four examples are used to illustrate the breadth, depth and flexibility of the Committee's deliberation and actions.

Three themes are used to examine the effectiveness of the RBERC approach to Committee implementation of environmental impact assessment recommendations: goals and objectives, committee composition, and committee coordination. For each theme, there is a brief statement of its generic importance in committee design and management, how it was accounted for in structuring and operating RBERC and the effectiveness of the approach applied.

The following factors are identified as being primarily responsible for the success of the RBERC approach and recommended for consideration in future similar exercises:

- full participation of the project proponent as a cooperative partner throughout the environmental management process;

- a $1.5 million budget to address the Environmental Assessment Panel's recommendations;
- the Committee's flexible interpretation of the Panel's recommendations and willingness to consider environmental concerns not addressed by the Panel;
- continuity of personnel serving as agency representatives on the Committee;
- hiring an environmental coordinator as staff support to the Committee;
- inclusion of all relevant parties on the Committee;
- recognition of the importance of both impact and mitigation monitoring.

EVALUATION: GENERAL CONSIDERATIONS

To encourage the discussion of common topics in the concurrent sessions, a number of questions were put forward for consideration. The main responses to these questions are summarized as follows:

1. What projects should be evaluated?

A selected but representative number of projects which have the potential for environmental or social impact should be evaluated. Projects may be selected to illustrate either positive or negative aspects so that actions can be taken in future projects.

2. What should be evaluated within a project?

Environmental, social and economic criteria should be used in the evaluation. Both technical and process questions should be addressed. Each phase of a project can be evaluated. The scope of evaluation can range from a complete examination of all phases of a project to an evaluation of permit conditions under a Waste Management permit. Some aspects requiring emphasis in these evaluations are the overall effectiveness of environmental programs, the effectiveness of mitigation, the resolution of residual impacts, the efficiency of established processes, and environmental quality prior to and following construction.

3. Who should do the evaluation?

Evaluation can be done by the proponent, by government, by a contractor or by an "arms length" organization such as a university or an appointed public body. Who does the evaluation will be based on the goals and objectives of the evaluation and on the use for which the results are intended. If an unbiased objective view is required, then the responsibilities for the

evaluation will rest with an independent body. If information is needed within an agency or by a proponent to better carry out some phase of the environmental program, then that agency or proponent should carry out the study. Availability of staff and funds may also determine who carries out the evaluation.

4. Who should pay for the evaluation?

Again, this will depend on the need for feedback information, on funding capabilities and on staff availability. In most cases, government or industry will be responsible for carrying out the evaluations. Requirements for monitoring (part of evaluation) already exist in some form in various provincial legislation or processes, for example the Waste Management Act and the Mines Act. The costs of evaluation will be borne by government and industry. The proponent will be assigned costs through permit requirements or through regulations. These will often be technical issues regarding impact mitigation effectiveness. Governments are more likely to assume costs related to evaluation of processes, legislation, or of a technical review nature.

5. What can evaluation provide?

Evaluation was seen to provide the basis for improving or testing all aspects of an environmental program. Improvements to review processes or to mitigation procedures and practices are the most evident benefits. Both time and cost savings should be achieved through evaluation. Two of the introductory papers on evaluation disclosed important relationships between interpersonal skills and effective environmental program management. These types of evaluation are providing new guidance for successful development and running of programs.

The importance of goals and objectives was stressed by a number of participants. Measurement of the attainment of these goals is needed to

enhance this aspect of future projects. Similarly, our ability to predict either impacts or success of mitigation was raised as an important issue which evaluation can shed light on.

6. How should evaluation be carried out?

Techniques and mechanisms for evaluation have not been standardized nor has there been sufficient work done to establish exacting guidelines to be followed for evaluation. It was recognized that specific goals and objectives for the evaluation had to be set very early. It was also pointed out that specific evaluative criteria have to be established. The level of effort for an evaluation should be considered in relation to the importance of the resources affected.

Evaluations will have to be tailored to the objectives. Careful planning will be needed by interdisciplinary groups who are made directly responsible for the studies.

7. What criteria are needed as a basis for evaluation?

The importance of establishing criteria for carrying out an evaluation was raised but the discussion did not extend into what criteria are specifically needed. Standards or guidelines have been established for carrying out many of the procedures which would be used in an evaluation. Biological and chemical monitoring have established criteria. Similarly, surveillance and supervision programs have now had criteria established for their implementation. Evaluation will also require some standards established.

8. What relative emphasis is warranted?

It was clearly pointed out by regional staff that any requirement for evaluation at the regional level would only be possible if other programs or efforts were cut. This was also stated by industry representatives and in general by all participants. Thus, it is evident that "evaluation" will be carried out when benefits can be shown to result and when project managers

or senior staff can be shown significant time or cost savings. The need for evaluation is generally accepted as is the need for monitoring. The reality of both evaluation and monitoring is that they are both costly and time consuming.

It was concluded that selected issues or projects be the subject of evaluations rather than requiring across the board evaluation. Specific types of projects and specific components within those projects should be evaluated. Emphasis might be placed on evaluation of projects giving cumulative impacts, projects which have tested new administrative processes or technical advances, or projects which are known to have resulted in unforeseen impacts.

EVALUATION: CURRENT B.C. PRACTICES

The need for environmental impact management results from industrial activities which take place within B.C. These activities are managed or regulated under a diverse set of legislative or regulatory requirements. Major impact generating industries include hydro generation and transmission, coal and metal mining, forestry, transportation (highways and railways), oil or gas pipelines, port facilities and a miriad of site specific industrial or municipal facilities. The impacts of these industries are managed through various pieces of legislation such as the Waste Management Act, the Water Act, the Mines Act, the Environment and Land Use Act, the Environment Management Act, the Federal Fisheries Act, etc.

Various processes based on this legislation have evolved to provide review or regulatory procedures for each of these industries. These are broadly categorized as "referral" processes or "guidelines" processes. They may be summarized as follows:

Coal and Metal Mining	Guidelines (Mine Development Review)
Transportation (highways)	Referral
(railways)	Guidelines
Pipelines	Guidelines (Energy Review)
Hydro (generation and transmission)	Guidelines (Energy Review)
Forestry	Referral
Industrial Municipal Facilities	Referral

Evaluation has been built into these processes to varying degrees. The present status of these was discussed by M. Kent for Highways, D. O'Gorman for Energy, R. Crook and J. Dick for Mines and Metal Mines, and R. Langford for a number of other projects. The discussion can be summarized as follows:

1. Transportation

(a) Highways

Through the referral process developed by the Ministry of Highways, a review of design and construction has been developed. As major projects are built, surveillance and supervision takes place through environmental officers who are responsible for weekly reporting and for a final summary report. To date, no formal requirement or process has been put in place for a comprehensive environmental evaluation by either MTH or MOE. Several evaluations have been carried out through contract. These include the early phase of the Coquihalla Highway (ESL) and certain aspects of the North Island Highway and the Tumbler Ridge Highway (W. Phillips).

(b) Railways

CNR, CPR and BCR have built new track in B.C. in the past few years. The processes for review have varied. Evaluations have not been carried out by the rail companies. An evaluation by MOE and W. Phillips reviewed the BCR Tumbler Ridge line, however, no other evaluation has taken place and no formal policy or procedure is in place to carry this out.

2. Coal and Metal Mines

Evaluation of process and technical aspects of mines has been occurring on a continual basis for a number of years. Internal evaluation and upgrading of the guidelines process are presently underway. Technical evaluation takes place within the mines permit system through Waste Management permit system and through individual mitigation plans established through conditions to "approval in principle" by ELUC. Independent evaluations have taken place for Utah and Amax mines (A. Dorcey) and currently for S.E. Coal mines (C. Day). Evaluations are also carried out by individual companies in the environmental programs and in their reclamation programs. The results of these studies have been used to enhance mitigation

procedures for both coal and metal mines. Review processes such as the Quinsam public hearing have benefitted from the technological and process improvements suggested by those studies.

The government review process for coal and metal mines has also changed radically because of internal evaluatin of the process.

Other recent improvements or innovations include a public monitoring committee for Equity Mines Ltd., a formal monitoring program and supervision program for Quinsam Coal, better linkage between design/construction and operation, and more regional input at all stages. Annual permit review and utilization of steering committees has also occurred as a requirement of implementing legislation.

No specific guidelines or criteria have been established within the Mines Development Review Process to standardize evaluation procedures or objectives.

3. Energy

The Energy Review Process has been used to require an evaluation to be carried out by the proponent under the Utilities Commission Act (Kelly Lake 500kv Transmission Line). This is the only case to date where this has been formally required. Evaluation was also carried out within the Project Analysis Branch of Energy for the same project. Evaluation was also carried out by MOE and through contract to W. Phillips. A great number of advances were made during this project and the evaluations have indicated the significant benefits which have resulted from both process and technological advances. These can be highlighted as follows:

(a) Technological

(1) Development of formal access road plan.
(2) Revegetation plan.
(3) Water crossings design.

(4) Clearing standards advanced.
(5) Archaeological site protection enhanced.
(6) Fish and Wildlife - timing windows required.

(b) Process

(1) Order under Section 19(1)(c) of U.C. Act.
(2) Formation of Regional Steering Committee.
(3) Authority for Steering Committee Activities.
(4) Environmental Supervision Program by Hydro.
(5) Approved Procedures Manual.
(6) Specific design documents and requirements.

Other recent projects were not required to provide a similar evaluation since they have not been regulated under the same section of the U.C. Act. Thus, neither the Cranbrook Alberta Border 500kv Line nor the Alaska Natural Gas Pipeline Prebuild were required to produce any evaluations.

At the present time, there is no formal policy or procedure for carrying out evaluation of energy projects except for those projects coming under Section 19(1)(c) of the U.C. Act.

4. Industrial/Municipal Facilities

Management of major projects which can be considered in this category include pulp mills, municipal dumps, municipal sewage treatment facilities, port facilities, and industrial plants. Regulation of these industries is carried out through the Waste Management Act as well as several pieces of Federal legislation. Some major industries permitted under provincial legislation are evaluated jointly by government and the proponent, however, many are not regularly evaluated. No guidelines or criteria exist for the evaluations.

The Roberts Bank coal terminal expansion project has had a detailed monitoring component as part of the environmental program. An evaluation of both technical and process aspects has been carried out.

No standard policies or criteria have been developed to guide evaluation of major industrial or municipal projects for either construction or operation.

EVALUATION: EXTENSION TO CURRENT PRACTICES

A variety of suggestions for improving the existing approaches to evaluation were put forward for consideration. The basic categories are as follows:

1. Policy

Individual ministries can set policies which establish a basis for carrying out evaluation or for judging the merit of evaluation carried out by a proponent or other ministry. This method for setting standards or for carrying out evaluations should now be established.

2. Protocol Agreement, Letter of Understanding, Letter of Agreement

These procedures can be used to establish various levels of agreement between two ministries or between two governments. This procedure could be used to establish an understanding on carrying out evaluation, either between ministries or between governments.

3. Ministerial Order

A ministerial order can be issued under specific pieces of legislation. The M.O. used for Kelly Lake - Nicola transmission line gave authority to the project steering committee to establish terms and conditions for the project, thus giving authority for requiring project evaluation. Other energy projects coming under the same section of the Utilities Commission Act could have the same requirement. Other pieces of legislation could also be used to establish ministerial orders for other projects.

4. Guidelines Processes

(a) Coal and Metal Mines

Use is presently made of existing legislation under the Mines Act, Environment and Land Use Act, Water Act, and Waste Management Act to establish criteria and requirements for project evaluations. The Mine Development Steering Committee regularly evaluates the review process and builds in technical evaluation through the permit system. It was pointed out in the workshop that any requirement to carry out extensive evaluations would mean that other parts of mine regulation would necessarily be cut and that it will be important to prove benefits from the work if it is to be carried out.

(b) Linear Projects

No projects are currently being administered through the Linear guidelines process and it is not anticipated that they will be in the future since most projects except railways would be considered under the Utilities Commission Act.

5. Permits and Regulations

Evaluations can and are required under permit conditions (e.g. Waste Permits and Mine Permits). The role of permitting could be extended to establish a more standardized or systematic requirement for evaluation. Various phases or complete reviews could be carried out under permit conditions.

As many projects do not obtain permits until well into the project approval process, this can not be used to review or evaluate either the process or early phases of assessment and construction. Many projects never do require permitting or licensing except for restricted portions of the project (e.g. transmission lines and pipelines).

6. Legislation

Legislation is the basis for all of the above mechanisms. Where warranted, new or amended legislation could be used to strengthen the ability of government agencies to require or carry out evaluation. This avenue is not seen as being necessary since existing mechanisms appear adequate for building a systematic framework under which evaluation can be carried out.

Summary

Technical and process evaluation is carried out in a variety of ways for major projects in B.C. These methods are generally ad hoc with little systematic structure for establishing goals and objectives, for carrying out the evaluations or for utilizing the results of the evaluation. Success is being achieved through a number of existing mechanisms which could readily be extended.

A number of avenues are available within existing legislation to develop formal evaluation mechanisms. It was the feeling of the workshop that a systematic, goal oriented approach be taken for evaluation of projects or project components. Cost effectiveness must be of primary concern in developing these requirements as any further work required by proponents or agencies will be at the expense of existing work allocations. Because of this, serious consideration must be given to the benefits which may result from project evaluations. These will be evident as cost savings to proponents or government; as improved mitigation technology; or as savings in time for assessment, review or construction. If these can be achieved, then a strong case can be made for more formlaized evaluation procedures.

The workshop presentations and discussions generated a number of common themes for consideration as the concept of evaluation is furthered. As was the case in Banff, the notion of learning from our experience with environmental planning, assessment and management was widely supported. Going

beyond this general understanding, the workshop was able to identify some of the major considerations that should be taken into account when developing or implementing evaluation programs in British Columbia.

1. Effective evaluation must be tailored to meet the specific objectives of the sponsoring organization. Consequently, each organization must produce its own policy and guidelines for evaluation. However, as evaluations will often cut across proponent/agency or agency/agency responsibilities, the development of cooperative approaches to conducting, funding and implementing the results of evaluation must be pursued.

2. To be successful, an evaluation program must be systematic with a recognized means of: 1) selecting criteria; 2) applying them to identified goals and objectives; and 3) incorporating the results into future activities.

3. Existing review processes for major projects in British Columbia either currently have provisions which permit or require evaluation or could be amended to provide the necessary requirements. Smaller scale review processes such as the numerous referral procedures are somewhat more problematic as a result of the volume of projects reviewed. It was recognized that these processes play a significant role in resource management decision-making and thus warrant evaluation. The use of spot checks was proposed as a means of responding to the volume problem.

4. The costs of conducting evaluations must be recognized. Conducting evaluations will be at the expense of some other component of project management. Careful documentation of both the costs and benefits of evaluation must be performed and used as the basis for justifying further evaluations. The level of effort should be guided by the value of the resource affected and the importance of the anticipated results. The use of contracted evaluations should be assessed, particularly when objectivity is important.

5. It was recognized that evaluation of biological or environmental aspects of projects is more advanced than economic or social evaluations. Selected projects should have economic or social evaluations designed and carried out.

APPENDIX 1

EVALUATION OF THE EFFECTIVENESS OF ENVIRONMENTAL PLANNING, ASSESSMENT AND MANAGEMENT OF PROJECTS PROPOSED WORKSHOP SCHEDULE

January 10, 1986

8:30 - 8:45	Introduction and review of workshop objectives	J. Secter
8:45 - 9:15 AM	Summary of Banff '85	B. Morgan
9:15 - 10:15 AM	Question and Answer Session: Summary Projects Reports	T. Dorcey W. Phillips B. Wilkes B. Moody
10:15 - 10:30 AM	Coffee	
10:30 - 12:00 AM	Discussion Session: 'Evaluation':* definitions, purpose, how to, who should	
	Facilitators	R. Everitt D. Munro
	Rapporteurs	B. Wilkes B. Morgan
12:00 - 1:15 PM	No Host Lunch	
1:15 - 2:00 PM	Current Application of 'Evaluation' in B.C.	R. Langford M. Kent D. O'Gorman R. Crook
2:00 - 3:00 PM	Discussion Session: B.C. Application (how it should be done; can existing processes meet the needs?)	
	Facilitators	D. O'Gorman T. Dorcey
	Rapporteurs	W. Phillips M. Zallen
3:00 - 3:15 PM	Coffee	
3:15 - 4:00 PM	Discussion Session: Recommendations for Furthering Application of 'Evaluation' in B.C. Terms of Reference and Policy	
	Facilitators	D. O'Gorman T. Dorcey
	Rapporteurs	W. Phillips M. Zallen
4:00 - 4:30 PM	Recommendations and Conclusions a) Rapporteurs 15 minutes b) General Discussion 15 minutes	

* Whenever the term 'evaluation' is used in this package, it refers to the Evaluation of the Effectiveness of Environmental Planning, Assessment and Management of Projects.

APPENDIX 2

GROUP STRUCTURE

GROUP A		GROUP B
Fac. D. Munro	A.M.	Fac. B. Everitt
R. B. Morgan		R. B. Wilkes
Fac. D. O'Gorman	P.M.	Fac. T. Dorcey
R. B. Phillips		R. M. Zalen
R. Driedger		S. MacDonald
E. Scales		K. Berry
C. Day		B. Langford
J. Wiebe		J. Millen
M. Kent		R. Crook
G. Alexander		J. O'Riordan
J. Secter		B. Baker
J. Dick		B. Moody
P. Scott		L. Foubister

APPENDIX 3

EVALUATION OF THE EFFECTIVENESS OF ENVIRONMENTAL PLANNING, ASSESSMENT AND MANAGEMENT OF PROJECTS WORKING DEFINITIONS

EVALUATION

- determination and analysis of:

  1) the accuracy of the environmental impact assessment and the effectiveness of the recommendations and mitigative measures; and
  2) the performance of organizations in satisfying their environmental goals, objectives and responsibilities.

MONITORING

- measurement of the environmental effects of a project

PROJECT MANAGEMENT

- the entire range of decisions and actions from project conception and planning through to abandonment

SUPERVISION

- overseeing of a project by qualified staff hired by the proponent or a contractor during project implementation to help control environmental impacts in the field and to ensure that the project is built according to environmental specifications

SURVEILLANCE

- field activities by or for government agencies to ensure that regulatory requirements and performance standards are complied with and that the recommendations from the assessment are incorporated into project design and are implemented in construction, operation and abandonment.